Space Weather Forecast

Issued on Saturday, 17 June 2023 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor/Moderate R1/R2 radio blackouts throughout. Slight chance of further G1 Minor geomagnetic storms this UTC weekend.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been moderate over the past 24hrs, with one Moderate-class flares observed at 16/1939UTC.

There are now up to seven sunspot groups on the visible disc, with a new arrival near the south-eastern limb awaiting a number, this region hard to classify due to positions, with changes likely in the coming hours and days as it rotates. The larger more complex groups in the southern/south-eastern disk continue to see some spot reconfiguration and slight development. All other spots appear generally stable.

There remain a number of large 'filaments' (arcs of plasma that can leave the Sun as Coronal Mass Ejections (CMEs)) on the Earth-facing side of the Sun, not least one near the middle of the visible face which would be likely to have an Earth-directed component should it lift off in the near-term. Peripheral CMEs observed in the period have been modelled and none carry an Earth-directed component.

Solar Wind / Geomagnetic Activity: The solar wind was reflective of ongoing connection to a strong 'coronal hole' fast wind. Within strong levels throughout, the solar wind speed rose slightly in the UTC early hours, with a very gradual reducing trend that partially reversed into the UTC evening. The number of particles in the solar wind was level and near background levels throughout. The associated magnetic field peaked at the start of the reporting period at slightly elevated levels, with a step-wise reduction after 03UTC. The north-south component was mainly anti-aligned with Earth's field (to greater effect), with this magnitude lessening with time.
The net result of the above solar wind measures was provisionally an erratic and gradual decrease from Active to Quiet geomagnetic conditions (Kp4-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity expected to be Low to Moderate, with a Chance of further Moderate flares, and a very Slight Chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: No CMEs feature in the current forecast, which is therefore an uncertain reduction in the current fast wind from an intense coronal hole and perhaps an adjoining more 'diffuse' successor.

Solar wind speeds should gradually decrease to elevated levels through Saturday 17 June, probably surviving at slightly elevated 18-19 June. Geomagnetic activity is forecast to see a

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surviving Slight Chance of further G1/Minor Storm conditions at first. Geomagnetic activity is expected to decline day-on-day, likely becoming quiet by Tuesday 20 June.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, though a very Slight Chance of enhancement throughout given the current configuration of front-sided sunspot groups.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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